

prominent are the low pressures which occupy the centres of continents in the summer months, and the northern portions of the Atlantic and Pacific Oceans in the winter months; and on the other hand, the high pressures which fill the centres of the continents in the winter months, and the high pressures in the oceans immediately to the west sides of the great continents, about lat. 36° , as shown by the Admiralty's physical charts of the Atlantic, Pacific, and Indian Oceans.

To take, as an example, the great summer barometric depression of Central Asia with the winds, flowing in upon it on all sides vertically, carrying with them the moisture of the ocean from which they come. Thus East Siberia is then swept by south-east and east winds, which distribute to westward as far as Irkutsk, in July, a monthly rainfall of 3 inches and upwards. Now since the annual rainfall of this region is all but wholly determined by the rains of the summer months, the extension of these rains inland wholly determines the position of the annual iso-hyetal lines. Again, to westward of long. 100° in Siberia, the rains have their origin in the Atlantic and Arctic seas, and since west and north-west winds prevail from Archangel to Central Asia, they bring with them comparatively so large a share of moisture from the ocean, as to raise the annual rainfall over the greater part of these northern regions to about 20 inches, or even more. On the other hand, on the east side of the Ural Mountains, which drain these winds of much of their moisture, the summer rainfall is much less. From north of the Caspian and Aral Seas, southward to the Persian Gulf, and eastward to the Indus, the summer winds are north-west, and since they thus advance over regions rapidly rising in temperature, little if any moisture is deposited in their train, thus rendering this extensive region one of the largest arid tracts of the globe.

These, with other considerations, indicate that the courses of several of the iso-hyetal lines, where observations are sparse, should be regulated to a greater extent than has been done in the map before us, by the positions of river-basins and mountain ranges in their relations to those seasonal winds, which really determine the annual amounts of the rainfall.

One of the most important points to which attention is drawn by Prof. Loomis, is that more rain falls on the eastern than on the western sides of continents. This remark holds good everywhere, until we reach the higher latitudes of both hemispheres, where the predominating winds become westerly. Thus the rainfall at San Francisco is only from a half to a third of the amount which falls on the coast of Pennsylvania in the same latitude; and about the same proportions, or even proportions still more striking, are seen on comparing Morocco with the Chinese coast, and the west with the east coasts of South Africa, Australia, and South America. The explanation is to be found in the portions of the areas of low and high pressures, with their accompanying winds, during the season whose rainfall determines the annual amounts. On the east side of the continents the prevailing summer winds are south-west, south, or south-east, which having traversed a large extent of ocean, and constantly advancing into higher and colder latitudes, spread a copious rainfall over the regions they traverse. But on the other hand, since the west side of continents in the same latitude lies between the region of abnormally high pressure in the ocean immediately to westward, and the low pressure of the interior, north-west winds in the northern, and south-west winds in the southern hemisphere prevail there; and as they advance into lower latitudes or over regions of a constantly increasing temperature, they deposit little or no rain in their course. Hence, owing to the failure, more or less complete, of the summer rains, it follows that the annual rainfall of these portions of the continents is small.

In preparing the second issue of the map, attention should be directed, in addition to the regions already

indicated, to the rectification of the lines of equal rainfall over Iceland, the south-east of Norway, the Gulf of Guinea, the temperate regions of South America, and Northern, Central, and Western Australia, and we feel assured meteorologists will heartily co-operate with Prof. Loomis, and give him all possible assistance in completing the important work he has so successfully begun.

NOTES

THE name of Prince Leopold (Duke of Albany) has been added to the General Committee of the Darwin Memorial Fund, subscriptions to which, we may remind our readers, are still being received at the Royal Society, Burlington House, by the Hon. Secretaries, Prof. T. C. Bonney and Mr. P. Edward Dove.

THE communication from Greenwich which appeared in our last number, p. 175, showed that in the double magnetic storms of April, the Greenwich times of commencement of disturbance were, for Greenwich, April 16, 11h. 32m., and April 19, 15h. 35m.; and for Toronto, Canada, April 16, 11h. 34m., and April 19, 15h. 34m. The communication in question was followed by one from M. Dechevrens, reporting the magnetic disturbance as commencing suddenly also at Zi-ka-wei, China, at 7h. 36m. on the morning of April 17, and as being as suddenly renewed at 11h. 40m. on the morning of April 20; equivalent to April 16—11h. 30m., and April 19, 15h. 34m. Greenwich time. The outbursts thus occurred at the same absolute time at Toronto, Greenwich, and Zi-ka-wei.

THE Prince and Princess of Wales opened the handsome new Technical School at Bradford on Friday. The Prince, in the various speeches he gave showed that he has a real appreciation of the necessity for scientific training in this country, if we are to keep on a level with the other great nations in our industry and commerce.

THE Commission appointed by M. Ferry to report on the construction of the rotating dome for the large refractor of the Paris Observatory, has held numerous meetings at the Conservatoire des Arts et Métiers, Col. Laussedat, director of the establishment, being in the chair. Only two projects have been reserved for final choice. M. Eiffel proposes to use a saline solution in a horizontal circular channel placed on the wall to diminish the weight of the rotary roof.

WE are glad to learn that owing to the exertions of Admiral Mouchez, magnetical observations will soon be resumed at the Paris Observatory, in subterranean chambers which have been excavated in the newly annexed grounds. These observations will be self-registering by photography, in conformity with the instruments established by M. Mascart at the Collège de France. Direct observations will also be conducted with the old instruments which were used by Arago, which were famous for his prognostications of Auroræ, at a period when, the electric telegraph not having been invented, many days must elapse before the arrival in Paris of news from the northern parts of Europe.

IN the course of a few weeks all the International circum-polar observatory parties will have arrived at their different destinations, or be on their way thereto, and on August 1 the observations will commence simultaneously on the common plan framed by the different conferences held in Hamburg in 1879, in Bern in 1880, and in St. Petersburg in 1881. By the present arrangement Russia has three stations, the United States and Germany two each, whilst England, Austria, Sweden, Norway, Denmark, France, Holland, Italy, and Finland maintain one each, of which three—the French, the Italian, and one German—will be established in the Antarctic regions. The total number

of stations will thus be sixteen, with a complement of some 150 men. The work will be carried on continuously for thirteen months, and the expeditions will leave their quarters on September 1, 1883. On their return an International Conference will assemble—it is suggested in London—in order to examine the material collected, which will, it is hoped, give important results, particularly as regards meteorology.

"LA LAMPE SOLEIL," or the sun lamp as it is called, from the likeness of its rays to solar light, was successfully tried on Saturday last in the vaults of the Royal Exchange. This lamp is the invention of MM. Clerc and Bureau of Brussels, and is so simple in its action as to require no regulating mechanism. It consists of a square block of marble or dry limestone, having two holes pierced into it from above. The holes slant together until they nearly meet just within the base of the block. Into these holes are inserted the two carbon rods forming the poles of the arc, and the current traversing the partition of calcareous stone between their points heats it to incandescence, and thus a soft white light is emitted from the bottom of the block. This light is remarkably steady, and is very suitable for picture galleries. It was used to light the picture gallery in the recent Paris Electrical Exhibition, and is now employed in the *foyer* of the Grand Opera House, Paris. The limestone is calcined by the current, and the carbons feed themselves by gravity as they are consumed. The ugly shape of the lamp is certainly against its use, unless it be sufficiently well screened from view, but its simplicity is decidedly in its favour.

THE new Report (1880) of the Smithsonian Institution contains among other valuable material, a Bibliography of Sir W. Herschel's writings, a list of his published portraits, and a long and very careful synopsis of his scientific writings. This last occupies nearly 100 pages, and its value to the student is evident. Appended there is a subject-index to the scientific writings of Herschel. The same volume contains the first results of the attempt of the Institute to issue a yearly report of the work done at observatories all the world over; the report covers upwards of 100 pages.

OF the Smithsonian Report, upwards of 200 pages are occupied with a Record of Recent Scientific Progress, in which Prof. Baird writes the Introduction, Prof. Holden, Astronomy, Dr. G. W. Hawes, Geology and Mineralogy, Prof. G. F. Barker, Physics and Chemistry, Prof. Barlow, Botany, Prof. Theodore Gill, Zoology, and Mr. O. T. Mason, Anthropology. Mr. Mason also contributes a separate Bibliography of Anthropology, in which (p. 412) we find the following curious entry—"Viking's (A.) ship."

ON the recommendation of the Agricultural Chamber in Stockholm the Swedish Government has accepted the invitation to participate in the International Fishery Exhibition to be held in London next year, and granted a sum of about 3000*l.* towards the expenses of representation. The Norwegian Government has also accepted the invitation, and a small sum has been voted by the Storthing.

AT a recent meeting of the Smoke Abatement Committee, held at 44, Berners Street, Mr. Ernest Hart in the chair, jurors' reports were handed in from Col. Festing, C.B., Prof. Chandler Roberts, F.R.S., Mr. Atchison, Mr. D. Kinnear Clark, Mr. Harris, and others, on behalf of the various juries, discussing the results obtained and tabulating the figures shown by the various tests. Great satisfaction was expressed at the excellent results which these reports show to have been achieved by some of the leading exhibits in the economy of fuel and abatement of smoke in open grates, as well as the satisfactory action of open grates and kitcheners intended for burning anthracite or smokeless coal. The hon. secretary (Mr. W. R. E. Coles) announced

that the Manchester Exhibition of Smoke-Abating Apparatus, carried out partly under the auspices of this Society, had proved highly successful, and had attracted great interest among the practical men in the Lancashire district, and would, it was believed, be fruitful in good results. The arrangements were discussed for converting this committee into a permanent institution for smoke abatement, under the provisions of the law. It was announced that the Duke of Westminster would preside at a meeting to be held at Grosvenor House on Friday, July 14, for the purpose of distributing the awards, when it was expected that all the reports and tabulations would be ready in the form of a volume for public information.

THE President of the Italian Antarctic Expedition has received, at Genoa, a letter from Lieut. Bove, announcing the arrival of the expedition at Punta Arenas, on April 24 from Staten Island. Staten Island has been thoroughly examined as to its fauna, flora, topography, hydrography, and commercial utility.

THE *Hope*, commanded by Sir Allen Young, left the Thames last week to search for and succour the *Eira*, under Mr. Leigh Smith, missing in the Arctic regions for about a year. The *Hope* is 450 tons register, is fortified for ice work, well equipped, and with provisions for two years, and a year's supply for the *Eira*. Sir Allen, while he will doubtless use his discretion, has been instructed to avoid entering the ice, if possible. It has certainly been a peculiar Arctic season, so far as ice condition are concerned, and Sir Allen may find when he gets on the ground that all his calculations and arrangements are at fault.

MR. C. HOLCOTT BROOKS, Secretary of the Californian Academy of Sciences, sends us the following note on a meteor in Wyoming, which he states is "well authenticated in all respects." "May 11, at 4 p.m., in Weber Cañon, Wyoming Territory, while the sun was shining brightly, a sudden and steady glow in the sky attracted attention to an immense meteor, whose brilliant colours were beautiful beyond description. Its track across the heavens was marked by a large red belt, which after its brightness had died out, left a column of clearly defined white smoke in its place. It fell in a south-easterly direction, and was observed by a scientist who recently arrived in this city, and who attended the meeting of the California Academy of Sciences last evening."

NEW seismic apparatus for indication of earthquake-motions on Etna have been devised by the brothers Brassart, at the instance of Prof. Tacchini. From an illustrated account in the *Rivista Scientifica Industriale*, we gather that the indicator for undulatory shocks is in form as follows: a funnel grooved interiorly (and looking like a small inverted umbrella) is fixed at one end of a pivoted horizontal bar having a counterpoise; it has an aperture at the bottom, which allows of its oscillating a little way with the bar on a vertical column, on which is placed a vertical style with weight at top (this latter act being facilitated by a sliding brass tube). This weight, by its fall (contrary to the direction whence the shock comes), into one of the eight lettered grooves of the funnel (N, E, &c.), indicates the direction, and, depressing the bar, closes a circuit, making an electro-magnet, the result being that the pendulum of a small clock on the base-board is liberated. Thus if the clock had been set at 12, and it indicated 5 when looked at, this would show that the liberating shock had occurred five hours before. An electric bell may be introduced; also the liberation of the pendulum may be effected without electricity. In an arrangement for vertical shocks, a spiral of fine-wire, with platinum-tipped weight, is suspended vertically over a cup of mercury;

the circuit being closed when the weight dips in the mercury, with effects as above.

THE Société Nationale d'Acclimatation de France, at its Annual General Meeting, lately held in Paris, awarded a medal of the first class to Mr. J. E. Harting, F.L.S., for his monograph on "Ostriches," and his recently-published work on "Extinct British Animals."

WE are glad to learn that the Geographical Society have finally resolved to make further use of the services of Mr. Joseph Thomson in the work of African exploration. The region to be explored by Mr. Thomson is that around Mount Kilimanjaro, about which our knowledge is so meagre. Mr. Thomson will set out in the beginning of next year.

WE have received a copy of an interesting address by Prof. F. W. Hutton of Canterbury College, New Zealand, on "Biology in an Arts Curriculum." The author takes as his subject the principle of selection, and after briefly explaining its importance in biology, proceeds to argue that it is of not less importance in psychology and sociology. The analogues, or rather parallels, which he draws are thoughtful and interesting, as the following examples will show:—"Either from transmission, or from early association, every man has a number of opinions common to the nation and to the class in life to which he belongs, which may be called his inherited opinions; but as his reasoning powers develop, these opinions are subject to variation. The variations may be owing to original ideas arising in his mind we know not how, like the variations of structure in animals; or they may be due to education, that is, to coming into contact with other minds, either personally or through books; and it must be noticed that, unlike structural variations, these mental variations may be produced at any time in a man's life, and may or may not remain constant. Physical transmission is not necessary; mental transmission from mind to mind diffuses a variation rapidly through all the individuals, and consequently it is not necessary for the action of selection that the originator of an improved mental variation should have any bodily offspring. When mental variations compete with one another, selection constantly acts on them through the agency either of utility or of sympathy." Similarly in Sociology Prof. Hutton shows that the principle of selection is all-important, and therefore that the political constitution which best admits of variation within due limits, or is most flexible, is most likely to survive in a struggle with other political constitutions. Hence, he maintains, the growing tendency of Monarchies to supplant Despotisms, and of Republics to supplant Monarchs; also of the progress of parliamentary forms of government—parliamentary discussion being but the principle of selection applied to political ideas. The parallels thus drawn between the principle of selection in biology and its operation in psychology and sociology, are well presented; but they are clearly in no way closely analogous to the survival of the fittest among organisms. There is just such a resemblance as there is in the case to which Prof. Hutton alludes of the analogy between the biological and the social organism, and which, as he truly observes, is incomplete and apt to be misleading. "Indeed, it would not be difficult to find in this analogy as many discrepancies as likenesses. What, for instance, in the organisation of an animal answers to the professors of theology, medicine, or law? What to prisons and reformatory?" &c. So, we think, in the principle of selection, although there is a general resemblance in its operation in biology and in psychology or sociology, the resemblance is nevertheless only general, and may not be pressed too far. Thus, the single fact noticed by the author that variations of ideas may propagate themselves without the aid of heredity, is alone sufficient to constitute an immense difference between the two classes of cases—the biological and the sociological—and it

is further evident that in biology there is nothing corresponding to individual judgment, which is the most important agent in selecting variations of ideas.

IN the current number of the *Journal of Forestry* is an excellent article on Epping Forest, in which the natural beauties of this well-known resort are faithfully portrayed. It is to be hoped that in the discussion that has raged and is still raging as to the management of Epping Forest under its new superintendent, the aim of Parliament for its preservation "in its natural aspect as a forest" will not be lost sight of. In the words of the writer of a paragraph on the subject in the same number of the *Journal of Forestry*, we repeat that "it is a forest that the public want, and not a gigantic park or tea garden."

IT is well known that of late a good deal of attention has been devoted in America to the manufacture of sugar from the Sorghum. In connection with this subject a letter has recently been published in the *New York Daily Tribune* from Prof. Silliman, in which he gives a detailed account of the value of the most important varieties. There seems to be a great future in America for the Sorghum as a sugar producer.

THE discussion of diurnal ranges of temperature having shown to Dr. Woeikof (*Izvestia* of the Moscow Society of Naturalists for 1881) how much they depend upon the topographical conditions of different stations, he discusses in the last number of the *Journal* of the Russian Chemical and Physical Society the influence of the same conditions on the average temperatures of winter and on the deviation from average temperatures, especially during anti-cyclones. Comparing the observations at different Swiss stations, he finds that the annual range of temperatures does not always diminish with the height of the station; it is less on isolated mountains, but it is greater in high valleys when they are wide. Discussing further the differences of temperature in valleys and on isolated mountains, he shows how the temperature of the air in the former is often much colder than on the mountains, as well in Switzerland as on the Caucasus, and in Eastern Siberia; and he concludes that the map of isotherms, recently published by Dr. Wild in his great work "On the Temperatures in the Russian Empire," does not give a true idea of the distribution of winter-temperatures, especially in Siberia; most of the stations of this country being situated in valleys, where the temperature is lowered during the winter by topographical conditions, the isotherms for January occupy altogether a too southern position on this map. Thus, for instance, the January isotherm of -31° which passes through the Voznesensky gold-mine, is lower by $7^{\circ}2$ than the true temperature for this place, and by $10^{\circ}1$ if the necessary reduction to the sea-level be taken into account.

ON the 14th inst., at 2 p.m., a severe earthquake was felt at the town of Luleå in Sweden ($65^{\circ} 40' N.$, $22^{\circ} 7' E.$). The shocks, which were several, were felt within a radius of thirty-six miles, doors being thrown open, flower-pots turned over, &c., through the tremor of the earth.

M. BRAZZA has delivered in the large hall of the Sorbonne a lecture on his discoveries in the Ogowe, and his efforts to establish a regular communication between the Ogowe and Congo through a land district. These efforts have proved successful.

THE frequent observations of the mirage in the south and central part of Sweden is very remarkable. From time to time we are told that whole landscapes, cities, and castles, with moving objects, have been observed reflected on the sky for hours, and we again learn that a similar display of the forces of Nature was seen one afternoon last month over the lake of Orsa, in a remote part of Dalcarlia, lat. 61° , which is stated to have reflected a number of large and small steamers, as if plying on the lake, and from whose funnels even the smoke could be

observed to rise. Later on the scene changed to a landscape, the vessels now taking the form of islands in the lake, covered with more or less vegetation, and at last the mirage dissolved itself in a haze. The phenomenon, which lasted from 4 to 7 o'clock p.m., is said to have furnished a most magnificent spectacle.

THE additions to the Zoological Society's Gardens during the past week include a Yellow Baboon (*Cynocephalus babouin* ♀) from West Africa, presented by Mr. A. Collison; a Slender Loris (*Loris gracilis* ♂) from Ceylon, presented by Mrs. A. H. Jamrach; a Vulpine Phalanger (*Phalangista vulpina*) from Australia, presented by Mr. E. Meek; a Burmese Tortoise (*Testudo elongata*) from the Western Dooars of Bhutan, presented by Mr. B. H. Carew; a — Tree Snake (*Ahaetulla liocercus*) from Pernambuco, presented by Mr. C. A. Craven; a Common Adder (*Vipera berus*), British, presented by Mr. F. W. Elliott; a Rude Fox (*Canis rufus*), a Common Rhea (*Rhea americana*) from South America, deposited; a Yellow Baboon (*Cynocephalus babouin*) from West Africa, received on approval; a Burrhel Wild Sheep (*Ovis burrhel*), born in the Gardens, eight Summer Ducks (*Aix sponsa*), six Swinhoe's Pheasants (*Euplectes swinhonis*), bred in the Gardens. The following insects having emerged during the past week:—Silk Moths: *Actias selene*, *Samia cecropia*, *Attacus mylitta*; Moths: *Hypochera io*, *Deilephila euphorbiae*, *Deilephila vespertilio*, *Trochilium apiformis*, *Sciapteron tabaniformis*, *Sesia muscivormis*, *Callimorpha dominula*; Butterflies: *Apatura iris*, *Vanessa xanthomelas*, *Vanessa urticae*, *Aporia crabægi*.

OUR ASTRONOMICAL COLUMN

MASKELYNE'S VALUE OF THE SOLAR PARALLAX.—Mr. Dunkin has consulted the first edition of Vince's "System of Astronomy," published in 1797, and finds therein Maskelyne's article on a new method of determining the solar parallax, the same as in the second edition which appeared in 1814.

Mr. W. J. Davies, writing from Tyglyn, Cilian Aeron, Cardigan, asks, with reference to this value of the parallax, Is it not probable that this was first published in the *Philosophical Transactions*? Prof. Ball, in his "Elements of Astronomy" (Longmans, 1880), page 361, gives the value 8° 723, and the authority for it, viz., *Phil. Trans.*, vol. lxi. p. 574, year 1771. At this point we may remark that Prof. Ball, according to the statement in his preface, has mainly relied for his numerical data upon Houzeau's "Répertoire des Constantes Astronomiques"—a work which, though excellently designed, would, according to our experience of it, benefit by a careful revision. There are a number of errors in the first edition, which are likely to be copied into more popular works, unless attention be drawn to them. In the present case, where reference is made for Maskelyne's parallax to the *Phil. Trans.*, 1771, p. 574, we find at that page a paper by Dr. Hornsby, entitled "The Quantity of the Sun's Parallax as deduced from the Observation of the Transit of Venus, on June 3, 1769, by Thomas Hornsby, M.A., Savilian Professor of Astronomy in the University of Oxford, and F.R.S.," in which the parallax from a number of combinations is found to be 8° 78. Maskelyne's name is not mentioned in the paper, which appears to relate exclusively to Hornsby's own deductions.

Mr. Dunkin having traced the publication of Maskelyne's note to 1797, the only earlier work of Vince in which it would be likely to be found, is the first edition of his text-book, the "Elements of Astronomy," 1790. Mr. Davies remarks that Olinthus Gregory, in his "Treatise on Astronomy," published in 1803, refers to Maskelyne's method, and considered it the best that had been given; he explains it almost in the same words as in Vince, adding that the assumed value 8° 83 was taken "agreeably to the result of observations on the transit in 1761."

THE COMET OF MAY 17.—M. Trépied, in an account of his observations made in Egypt during the total solar eclipse of May 17, which was communicated to the Academy of Sciences on the 19th inst., has the following interesting note:—"Vers le milieu de la totalité, j'aperçus à droite du Soleil, par un angle

zénith de environ 90°, un trait légèrement courbé vers le bas, d'un effet singulier, et en discordance évidente avec le reste de la couronne. Je n'ai pas eu un seul instant l'idée que ce pouvait être une comète; je n'en ai reconnu la nature qu'une heure après l'éclipse, en comparant mon croquis à l'une des photographies obtenues par le Dr. Schuster. Cette photographie montrait nettement le noyau à une distance du bord du Soleil un peu supérieure au diamètre de cet astre; l'angle zénith et la direction de la queue s'accordaient bien avec ce que j'avais dessiné, mais j'avais arrêté le trait à une distance beaucoup trop faible du bord. Je n'ai pas cru cependant qu'il me fut permis de rien changer à mon dessin." The sketch referred to is copied in the *Comptes rendus* of the above sitting of the Academy. M. Trépied further remarks: "L'éclat de la comète m'a paru du même ordre que celui des parties extérieures de la couronne." The position of the observing station, as provisionally determined by M. Trépied, is in longitude 1h. 57m. 40s. east of Paris, and latitude 26° 33' 21", where the middle of totality occurred at 8h. 31m. 53s. a.m. local mean time. M. Trépied says in the week following the eclipse he searched for the comet many times before sunrise and after sunset, but without detecting it.

The comet has doubtless been sought for elsewhere, though unfortunately without success. The object notified as having become visible some ten days since in the Cape Colony, near the sun in the evenings, would be the comet 1882 a (Wells), March 17.

DAYLIGHT OBSERVATION OF COMET 1882 a.—Prof. Julius Schmidt writes to the *Astronomische Nachrichten* that on June 10 after 3 p.m., in an exceptionally clear sky at Athens, he observed the comet, though with difficulty, in the 6-foot refractor of that observatory. By ten observations (the instrumental corrections from previous determination) the approximate position was found to be—

h. m.	h. m. s.
June 10, at 3 59' 7 M.T. Athens, R.A. 50 40,	Decl. +23° 19' 4.

This place differs from that inferred from the last orbit given in this column (on observations to May 21) by -5° 5' in R.A. and +3° 2' in declination. The comet's distance from the nearest limb of the sun was about 2° 8'.

PHYSICAL NOTES

PROFESSORS BELLATI AND NACCARI, of the University of Padua, have recently sent to the Academy of Sciences at Turin, a memoir on the heat developed in solid and liquid dielectrics by successive electrostatic polarisations. They find that when a dielectric, placed between two metal armatures, is subjected to successive polarisation; by means of a Ruhmkorff's coil, the dielectric is warmed. This result had already been obtained by Siemens and Righi in the case of glass; the authors of the memoir have experimented also on liquid dielectrics. They have employed two methods: in one of these the heating was indicated by the dilatation of the liquid dielectric (or, in the case of a solid dielectric, of another liquid) observed in a capillary tube. In the other method, the liquid dielectric was contained in a glass vessel, in which were two concentric metallic cylinders serving as the armatures of a condenser. The outer one of these two cylinders was open above and below; the other was closed, and communicated with a horizontal capillary tube containing benzine. This cylinder, therefore, acted as the bulb of an air-thermometer, the heating of the dielectric being indicated by the displacement of the benzine in the capillary tube. This phenomenon must not be confounded with the electric expansion discovered by Fontana more than a century ago, and more recently studied by Govi, Duter, and Quincke. The true electric expansion is instantaneous, and ceases when the polarisation ceases; but the expansion due to the heat developed in the dielectric by repeated charges and discharges is progressive, and increases by prolonging the action of the induction coil. Professors Bellati and Naccari found no electrolytic decomposition in the dielectric, nor was the heating due to the passage of a feeble current through the dielectric.

THE utilisation of the earth's internal heat is a subject which is attracting the attention of scientific men in Japan just now. At a recent meeting of the Seismological Society, Mr. Milne introduced the subject for the consideration of the members. He first drew attention to the fact that philosophers have told us the whole available energy upon the surface of the earth had in some